भारतीय मानक
Indian Standard

IS 17862 : 2022

ई-वेस्ट का भंडारण, संग्रह, निराकरण और पुनर्चक्रण — दिशानिर्देश

Storage, Collection, Dismantling and Recycling of E-Waste — Guidelines

ICS 13.030.10

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March 2022 **Price Group 3**

Solid Waste Management Sectional Committee, CHD 33

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards after the draft finalized by the Solid Waste Management Sectional Committee, had been approved by the Chemical Division Council.

Electronic waste or e-waste is a highly varied stream of hazardous waste. This waste stream is comprised of any electronic items that a consumer or business intends to dispose of, or is no longer useful for its original purpose. E-waste has generated a considerable amount of public interest due to a confluence of factors, including: the exponential rise in the generation of e-waste, the potential value of recycling the waste in order to recover precious metals and other elements, and the environmental and human health risks associated with improperly storing, disposing of, and recycling e-waste.

Hence, need has been felt to develop standard for providing guidelines for storage, collection dismantling and recycling of E-waste.

This standard describes guidelines for storage, collection dismantling and recycling of E-waste which should be implemented in conjunction with relevant notifications of Ministry of Environment, Forest and Climate Change (MoEF & CC) and Central Pollution Control Board (CPCB).

The composition of technical committee responsible for formulation of this standard is given in Annex A.

Indian Standard

STORAGE, COLLECTION, DISMANTLING AND RECYCLING OF E-WASTE — GUIDELINES

1 SCOPE

This standard specifies guidelines for the storage, collection, dismantling and recycling of E Waste by the producer of electrical and electronic equipment (EEE), the dismantler and/or recycler to:

a) demonstrate its ability to consistently carrying out storage, collection, dismantling and recycling activities of e-waste meeting applicable statutory and regulatory requirements; and

b) satisfy the requirements of society, customer of recycled products, and waste management hierarchy and resource conservation through the effective application updated technologies, systems including processes for improvement.

2 REFERENCES

The standards listed below contain provisions which, through reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated.

IS No	*Title*
IS/ISO 14001 : 2015	Environmental management systems — Requirements with guidance for use
IS/ISO 45001 : 2018	Occupational health and safety management systems requirements with guidance for use

2 TERMS AND DEFINITIONS

For the purposes of this document, the terms and definitions given in E-waste (Management) Rules, 2016 and Implementation Guidelines for E-waste (Management) Rules, 2016 and following shall apply.

2.1 Channelization — 'Channelization' means to direct the path for movement of e-wastes from collection onwards to authorised dismantler or recycler. In case of fluorescent and other mercury containing lamps, where recyclers are not available, this means path for movement from collection centre to authorised treatment, storage and disposal facility;

2.2 Collection Centre — Collection centre means a centre or a collection point or both established by producer individually or as association jointly to collect e-waste for channelising the e-waste to authorised recycler and play such role as indicated in the authorisation for extended producer responsibility granted to the producer and having facilities as per the guidelines of Central Pollution Control Board (CPCB), including the collection centre established by the dismantler or refurbisher or recycler which should be a part of their authorisation issued by the State Pollution Control Board where the facility exists.

2.3 Consumer — Consumer means any person using electrical and electronic equipment.

2.4 Dismantler — Dismantler means any person or organisation engaged in dismantling of used electrical and electronic equipment into their components and having facilities as per the guidelines of Central Pollution Control Board and having authorisation from concerned State Pollution Control Board.

2.5 EEE — Electrical and electronic equipment means equipment which are dependent on electric current or electro-magnetic field in order to become functional.

2.6 EEE Code — Code numbering is given to each of the electrical and electronic equipment under different categories to be used by the producers in the schedule I serial number I and II in the E- waste Management Rules, 2016 amended in 2018.

2.7 End-of-Life — End-of-life of the product means the time when the product is intended to be discarded by the user .

2.8 Environmentally Sound Management of E-Waste — Environmentally sound management of e-waste means taking all steps required to ensure that e-waste is managed in a manner which shall protect health and environment against any adverse effects, which may result from such e-waste.

2.9 E-Waste — E-waste means electrical and electronic equipment (EEE), whole or in part discarded as waste by the consumer or bulk consumer as well as rejects from manufacturing, refurbishment and repair processes.

2.10 E-Waste Generators — E-waste generators includes the individual who generates e-wastes at the end of life of the used EEE (Electrical and Electronic Equipment) and/or the organisations who are the manufacturer, producer, bulk consumer, collection centre, dealer, refurbisher, dismantler and recycler who need to store the e-waste.

2.11 Extended Producer Responsibility — Extended producer responsibility means responsibility of any producer of electrical or electronic equipment, for channelisation of e-waste to ensure environmentally sound management of such waste. Extended producer responsibility may comprise of implementing take back system or setting up of collection centres or both and having agreed arrangements with authorised dismantler or recycler either individually or collectively through a producer responsibility organisation recognised by producer or producers in their extended producer responsibility authorisation.

2.12 Historical E-Waste — 'Historical e-waste' means e-waste generated from electrical and electronic equipment as specified in schedule I of E-waste Management Rules, 2016 , which was available on the date from which these rules come into force.

2.13 Orphaned Products — Orphaned products means non-branded or assembled electrical and electronic equipment as specified in schedule I or those produced by a company, which has closed its operations.

2.14 PRO (Producer Responsibility Organisation) — 'Producer responsibility organisation' means a professional organisation authorised or financed collectively or individually by producers, which can take the responsibility for collection and channelisation of e-waste generated from the 'end-of-life' of their products to ensure environmentally sound management of such e-waste;

2.15 Producers — 'Producer' means any person who, irrespective of the selling technique used, such as dealer, retailer, e-retailer, etc.; manufactures and offers to sell:

a) electrical and electronic equipment and their components , consumables , parts or spares under its own brand;
b) under its own brand, assembled electrical and electronic equipment and their components, consumables, parts or spares produced by other manufacturers or suppliers; or
c) imported electrical and electronic equipment and their components, consumables, parts or spares.

2.16 Recyclers — Recycler means any person who is engaged in recycling and reprocessing of waste electrical and electronic equipment or assemblies or their components and having facilities as elaborated in the guidelines of Central Pollution Control Board (CPCB).

2.17 Refurbishment — Refurbishment means repairing of used electrical and electronic equipment (EEE) listed in schedule I of E-waste Management Rules, 2016 extending its working life for its originally intended use and selling the same in the market or returning to owner.

2.18 Refurbisher — Refurbisher as per E-waste Management Rules, 2016 means any company or undertaking registered under the *Factories Act*, 1948 or the *Companies Act,* 1956 or both or district industries centre (DIC) engaged in refurbishment of used electrical and electronic equipment.

3 E-WASTE STORAGE, COLLECTION, DISMANTLING AND RECYCLING SYSTEMS

The producer, dismantler, PRO, refurbisher and recyclers of E-waste shall establish and maintain the system of storage, collection, dismantling and recycling as described below. A risk-based thinking is essential for achieving an effective management system. Business risk analysis and exploring opportunities for improvement may help achieving organisational and process sustainability. Categories of electrical and electronic equipment (EEE) including their components, consumables, parts and spares shall use the applicable EEE codes as per schedule I serial number I and II of E-waste Management Rules, 2016.

3.1 E-Waste Storage

The e-waste shall be stored, collected, transported, dismantled, refurbished and recycled. The procedure shall be established by the manufacturers and PROs.

E-waste generated shall be stored by the waste generator/s in such a way that no damage is caused to the environment during storage is ensured. The storage facility shall establish a suitable method of segregation of non-recyclable or non-recoverable components. Every e-waste generator shall comply with the national legislation with respect to storage duration of e-waste.

A procedure for handling and storage of hazardous constituents within the e-waste shall be established and maintained. Storage of hazardous constituents of the e-waste shall be made separately and records shall be maintained. Information on hazards of improper handling, disposal, accidental breakage, damage or improper recycling of e-waste shall be maintained and communicated to the people for proper actions.

Record shall be maintained of the e-waste generated and stored in a standard format.

Reference — The form-2, form for maintaining records of e-waste handled or generated [See rules 4(4), 5(4), 6(5), 8(7), 9(2), 10(7), 11(8), 13 (1) (xi), 13(2)(v), 13(3) (vii) and 13 (4)(v) of the e-waste management Rules 2016] may be used.

3.2 E-Waste Collection

The producer of electrical and electronic equipment (EEE), the dismantler and/or recycler shall establish and maintain procedure of tracking, collection, channelising and transportation of the e-waste generated from the 'end-of-life' of their products or 'end-of-life' products with same electrical and electronic equipment code and historical waste (orphaned Products) available. The producer shall establish and maintain a procedure for the activities of any professional agency like Producer Responsible Organisation (PRO) if appointed on his behalf for collection of e-waste by involving relevant stakeholders, such as consumer, bulk consumer, informal sector, resident associations, retailers and dealers, etc. In collective system, producers may tie-up as a member with a Producer Responsibility Organisation (PRO) or with e-waste exchange or both.

The producer of EEE shall prepare and submit the annual collection plan as per the EPR (Extended Producer Responsibility) system in the country and comply with the system requirements.

The e-waste collection centres and/or TSDF (Treatment, Storage and Disposal Facility) shall establish and maintain a procedure for collection of mercury containing lamps including fluorescent lamps and other items where the recycling facilities are not available.

Producer and/or PRO shall establish and maintain a procedure for handling and collection of hazardous constituents within the e-waste. Information on hazards of improper handling, disposal, accidental breakage, damage or improper recycling of e-waste shall be maintained and communicated to the people for proper actions.

The collector of e-waste shall ensure that no damage is caused to the environment during collection and transportation of e-waste to authorised collection centres or dismantlers or recyclers.

Record shall be maintained of the e-waste collected in a standard format.

Reference — The Form-2, form for maintaining records of e-waste handled or generated [See rules 4(4), 5(4), 6(5), 8(7), 9(2), 10(7), 11(8), 13 (1) (xi), 13(2)(v), 13(3)(vii) and 13 (4)(v) of the e-waste management Rules 2016] may be used.

3.3 E-waste Dismantling and Refurbishing

The dismantler/s shall establish and maintain procedure of dismantling and refurbishing systems and techniques of the collected and stored e-waste including orphaned Products at the facility of dismantling processes.

The dismantler/s shall ensure that no damage is caused to the environment and have no adverse effect of environment and employee health during the dismantling activities of e-waste at the facility.

Dismantled e-waste shall be segregated, identified and sent to the authorised recycling facilities for recovery of materials. It shall have a system of quarantining non-recyclable or non-recoverable components for sending to authorised TSDF.

Record shall be maintained of the e-waste dismantled and refurbished in a standard format.

Reference — The form-2, form for maintaining records of e-waste handled or generated [see rules 4(4), 5(4), 6(5), 8(7), 9(2), 10(7), 11(8), 13 (1) (xi), 13(2)(v), 13(3)(vii) and 13 (4)(v) of the e-waste management Rules 2016] may be used.

3.4 E-Waste Recycling

The producer of EEE, the dismantler and/or recycler shall establish and maintain safe procedure of recycling, recovery or reuse and including any physico-chemical or biological treatment, incineration and deposition in secured landfill.

Procedure including formulation sheet for operation of processes including process parameters involving recycling/recovery/reuse/physico-chemical/biological treatment/incineration/deposition in secured landfill shall be established, communicated and practised for respective operations.

Process equipment and calibrated measuring equipment/instruments shall be maintained. Process safety requirements shall be communicated and maintained during e-waste recycling. Deviation in the process should be recorded and analysed and corrective/preventive actions shall be taken for improvement. The trained and competent personnel shall be involved in recycling process.

Record shall be maintained of the e-waste recycling in a standard format.

Reference : The Form-2, form for maintaining records of e-waste recycling [See rules 4(4), 5(4), 6(5), 8(7), 9(2), 10(7), 11(8), 13 (1) (xi), 13(2)(v), 13(3)(vii) and 13 (4)(v) of the e-waste management Rules 2016] may be used.

4 SUPPORT SYSTEMS

4.1 Legislative Compliance

The producer of electrical and electronic equipment (EEE), the authorised dismantler and/or recycler shall establish and maintain procedure for identification of applicable legislative and regulatory requirement and the system for compliance and monitoring. Record of legislative compliances shall be kept.

4.2 Training of the Personnel

The producer of EEE, the authorised dismantler, refurbisher and recycler shall ensure that trained and competent workers are involved in storage, collection, dismantling, refurbishing and recycling process. Periodic training and competence monitoring shall be carried out.

4.3 Transportation

The producer of EEE, the authorised dismantler, refurbisher and recycler shall ensure that appropriate transportation systems including legislative, regulatory, safety and environmental compliances for transportation of respective e-wastes.

4.4 Documents and Record

The producer of EEE, the authorised dismantler, refurbisher and recycler shall ensure development of required documents at the facility. Updated authenticated documents shall be made available at respective functions. Outdated documents shall be withdrawn immediately after the same is outdated and the updated document/s shall be made available.

Record shall be maintained of the e-waste generated, stored, collected, recycles, refurbished and final disposal in a standard format by responsible organisation/s and individuals. The Form-2, form for maintaining records of e-waste handled or generated [*see* rules 4(4), 5(4), 6(5), 8(7), 9(2), 10(7), 11(8), 13 (1) (xi), 13(2)(v), 13(3)(vii) and 13 (4)(v) of the e-waste management Rules 2016] may be used.

Records shall be analysed on regular basis for improvement.

4.5 Safety and Environmental Aspects Including Emergency Preparedness and Response

The producer of EEE, the authorised dismantler, refurbisher and recycler shall establish and maintain a procedure to ensure safety and health of workers involved in dismantling and recycling considering the Occupational safety and health aspects and monitoring which includes use of proper personal protective gear for all the personal coming in the facility as per need.

The producers shall ensure the capacity and capability of its authorised dismantlers/recyclers/PROs to ensure environmentally sound management of e-waste according to IS/ISO 14001 and shall ensure minimum or zero environmental consequences of hazards associated with its operations including transportation according to IS/ISO 45001.

The health monitoring of the employees engaged in the e-waste recycling process will be governed by the national/local rules and regulations. Record of such monitoring will be kept.

The authorised dismantlers/recyclers/PROs shall establish and maintain the procedure for emergency preparedness and response. Trained personnel in each shift should be present who are capable of handling emergency situation and respond effectively. Records of accidents and near miss cases shall be kept for analysis for taking corrective and preventive actions for improvement.

4.6 Equipment Health Monitoring

The producer of EEE, the authorised dismantler, refurbisher and recycler shall establish and maintain a procedures for the health monitoring of the machineries, equipment, measuring instruments.

Right equipment shall be made available for the operation. Appropriate equipment shall be calibrated, monitored and maintained on specified periodicity.

4.7 Communication

4.7.1 The producers of EEE shall provide following details of take back system:

a) Appropriate media, namely website, toll free number, link of their web site where information pertaining to take back system is available for consumers/bulk consumers;

b) Details of their dealers, retailers, collection points/bins/pick up vans linked to collection centres for depositing of e-waste by the consumer/bulk consumers if they are part of the take back system;

c) Details of any incentive scheme for consumers/bulk consumer for returning of e-waste;

d) Phone number/mobile numbers of grievance redressal in case, toll free number is not working; and

e) Details of authorised dismantlers/recyclers who can take back e-waste on behalf of the producer if dismantlers/recyclers are part of take back system.

4.7.2 The producer of EEE, the authorised dismantler, refurbisher and recycler shall establish and communicate the documented procedures followed for storage, collection, transportation, dismantling, handling of hazardous wastes, recycling and final disposal, emergency situation arising out of any accident/incident/near miss events, standard operating procedures (SOP) and operation control procedures (OCP) to internal management as well as to the relevant stakeholders.

4.8 Data Security

Procedure for complete data wiping and/or data destruction from the electrical and electronic equipment (EEE) of e-waste stream, with data memory card/devices like computer/laptops/desktops/mobile phones or any other such equipment, shall be established and maintained by the authorised dismantlers/refurbisher/recyclers to prevent potential data leaking. The authorised dismantlers and/or recyclers shall identify and comply with national rules/regulations pertaining to the data wiping or data destruction from the e-waste components, if any. Record of data wiping and/or data destruction have to be maintained. Provision of issuance of certificates of data wiping/destruction upon request by the identified owner of the device/s should be established by the authorised dismantlers/refurbisher recyclers.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Solid Waste Management Sectional Committee, CHD 33

Organization	*Representative(s)*
Central Road Research Institute	Ms Anuradha Shukla (***Chairman***)
Alkali Manufacturers' Association of India	Shri K. Srinivasan Dr H. S. Das (*Alternate*)
Cement Manufacturers Association, New Delhi	Shri Anil Kumar Trivedi Shri Gopal Gupta (*Alternate* I) Dr Rachna Sharma (*Alternate* II)
Central Pollution Control Board, New Delhi	Shri J. S. Kamyotra
Central Road Research Institute, New Delhi	Dr Shikha Swaroop Kar Dr Rina Singh (*Alternate*)
Confederation of Indian Industry, New Delhi	Mrs Seema Arora Shri Kamal Sharma (*Alternate*)
Delhi Technological University, Delhi	Dr (Shrimati) Anubha Mandal (*Alternate*)
Department of Science and Technology, Ministry of Science, GOI	Dr R. K. Joshi
Development Alternative	Dr K. Vijaya Lakshmi Dr Palas Kumar Haldar (*Alternate*)
Engineers India Limited, New Delhi	Shri R. S. Prasad Shri Vikram Singh (*Alternate*)
Federation of Indian Chambers of Commerce and Industry, New Delhi	Ms Archana Datta Ms Suchismita Mukhopadhyay (*Alternate*)
Hindalco Industries	Shri Pradip Kumar Banerjee Shri Soubhagya Kumar Tripathy (*Alternate* I) Ms Rashmi Gupta (*Alternate* II)
In personal capacity	Dr N. B. Mazumdar
In personal capacity	Dr Vimal Kumar
In personal capacity	Ms Sanchita Jindal, Former Advisor (Scientist G), MoEF & CC
In personal capacity	Shri Pradeep Kumar Khandelwal (Retd Chief Engineer, EDMC)
Indian Centre for Plastics in the Environment, Mumbai	Shri T. K. Bandopadhyay Shri Gopal Jha (*Alternate*)
Indian Chemical Council, Mumbai	Dr N. J. Singh Shri A. A. Panjwani (*Alternate*)
Indian Oil Corporation Ltd, Faridabad	Dr M. P. Singh
ITC Limited	Shri Sanjib Bezbaroa
Jadavpur University	Dr Sadan K. Ghosh
Ministry of Defence, DRDO, New Delhi	Shri M. Pandit Dr S. Mary Celin (*Alternate*)
Ministry of Environment, Forest and Climate Change	Shri Satyendra Kumar Shri Amit Love (*Alternate*)

Organization	*Representative(s)*
Ministry of Urban Development, New Delhi	Shri Udit Ratna Shri P. K. Duria (*Alternate*)
National Council for Cement and Building Material, New Delhi	Shri Anupam Shri Prateek Sharma (*Alternate*)
National Solid Waste Association of India	Shri Amiya Kumar Sahu Capt Manju Minhas (*Alternate*)
NTPC Limited, New Delhi	Shri Shiv Charan Meena Shri K. Karthikeyan (*Alternate*)
PHD Chamber of Commerce	Nomination Awaited
Steel Authority of India Limited, New Delhi	Shri Rajnish Kumar Gupta Shri Inderpal Dhull (*Alternate*)
Steps Pvt Ltd	Shri T. Raghavendra Rao
Sulabh International Social Service Organization	Awaited
The Energy and Resources Institute, New Delhi	Dr Suneel Pandey Shri Kaushik Chandrashekhar (*Alternate*)
The Fertilizer Association of India, New Delhi	Shri Manish Goswami Shri G. M. Patel (*Alternate*)
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Member Secretary

Shrishti Dixit
Scientist 'D' (CHD), BIS

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This Indian Standard has been developed from Doc No.: CHD 33 (17536).

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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Published by BIS, New Delhi